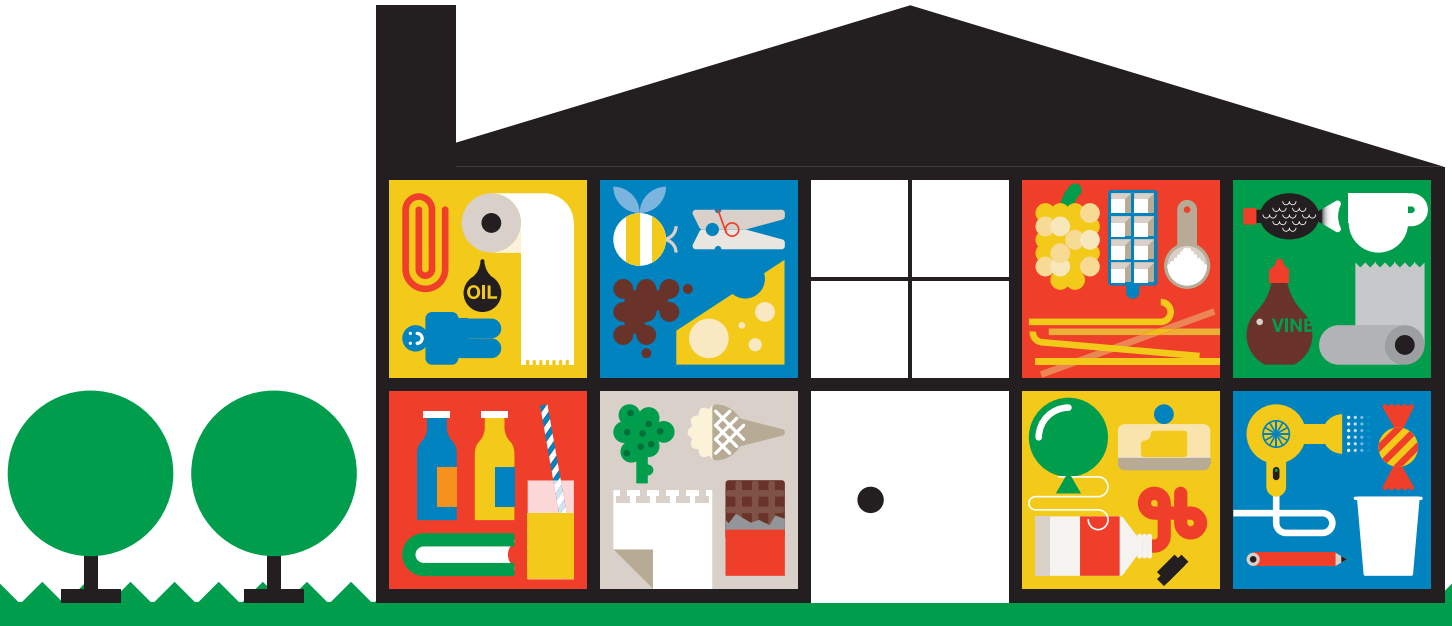
Hollow masks

The activity

Make your own hollow mask illusion.

ExpeRiment with the way we see faces.

Learn how our expectations can override what we are actually seeing.



ExpeRimental —
Bringing Science Home

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What you'll need

- Balloons
- Newspaper
- Wallpaper paste or PVA glue
- Scissors
- Paintbrushes
- Paint

Special materials

A torch can help you change the lighting of your hollow mask.

What to do

Being safe

Adult supervision is advised while using scissors.

Introduction: Show your children the hollow mask video you can find at rigb.org/ExpeRimental. Get them wondering how it works and suggest you try making your own.

Activity: Heads up, the papier mache will need to dry at least over night, so this might be a good two-part weekend activity.

To make your hollow mask, first you'll need to blow up the balloon and tie it off, shred the newspaper into short strips, and mix your wallpaper paste (according to the instructions), or mix 2 parts PVA glue with 1 part water. Dip the newspaper pieces in the mixture and paste onto the balloon. Cover the whole balloon with at least three layers, but the more layers you put the sturdier your masks will be. Let the papier mache dry out in a warm dry place, overnight should do.

Once the balloon is dry, carefully pop the balloon and cut the papier mache in half from the knot end of the balloon over and around the top, to make two masks.

Remove any rubber left from the balloon and your mask is now ready to paint. Just remember to paint the inside of the mask! The illusion works best when the face fills the whole mask.

Once the paint is dry, take a look at the masks and see if the face appears to pop out at you.

Some things to try and help the illusion include looking at the mask from a distance, or with one eye. Also play with the

Continues >>

More info about — Hollow masks

What to do (continued)

lighting. Lighting the mask from below and in front can help. Another thing to try is using a phone camera to look at the mask through the screen.

Follow up: Discuss with your children how well they think it works and which of the above help them see the mask as convex, rather than concave.

Try showing the mask to people who haven't seen you make it, they may have different expectations.

Questions to ask children

Before the activity:

What is happening in the video? (Available at rigb.org/ExpeRimental)

Why might that happen?

During the activity:

What could you try painting instead of a face? Will that still work?

What factors help/ruin the illusion?

After the activity:

What expectations do we have of faces?

How did this illusion match up to those expectations?

The science

This illusion works in part because we expect a face to be convex and not concave, we have no template for a concave face already in our mind, so we make assumptions about how the face must work.

Plus, when using only one eye, or looking from far enough away, we also lose our stereoscopic vision (the ability to see in 3D thanks to the different point of view of each eye) and so go by other visual cues, such as the way the face is turning and the shadows are moving.

Continues >>

More info about — Hollow masks

The science (continued)

Lighting the mask from below will help the illusion as we expect objects to be lit from above, and in this inverted face, the shadows from upward lighting match that of downward lighting on a convex face, for example, shadows at the chin and well lit at the forehead.

Viewing the illusion through a camera phone also removes your 3D vision as you are now viewing a 2D image on your phone screen.

Going Further

You can find similar illusions to make at rigb.org/ExpeRimental.